



Commonwealth of Massachusetts  
Executive Office of Energy & Environmental Affairs

## Department of Environmental Protection

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Commissioner

DELIVERED BY HAND

July 23, 2012

Mr. Peter DeTerra, Chairman  
Fairhaven Board of Health  
Town Hall  
40 Center Street  
Fairhaven, MA 02719

Dear Chairman DeTerra;

I am writing in further reference to the Board's request for assistance in the matter of wind turbine noise assessment. With this letter, I am conveying the protocol MassDEP will use to conduct sound sampling of the two Fairhaven Wind Turbines. The protocol defines the conditions under which we will test as well as the sites where we will conduct the sampling. The specific sampling dates will be dependent on weather, wind speed and wind direction. MassDEP will be using our own resources and equipment to conduct this assessment and will be coordinating sampling with Fairhaven Wind and selected homeowners.


This protocol is typical for a compliance study of sound impacts but has been modified slightly to accommodate the unique nature of the wind turbine and wind turbine sound. The protocol is consistent with the protocol used in the Town of Falmouth and with existing state policy and procedures.

As indicated in the protocol, the initial sampling will be done in the early morning hours. Typically, early morning is the time of lowest background/highest impact so we can determine the worst case impact (other times of day would experience less impact as background sound would be higher). If sampling during this "worst case" condition indicates that there are no exceedences of the MassDEP 10 dBA sound threshold for noise, we will terminate sampling.

We will keep you informed of our progress but please be advised that we will not release results until all of the sampling has been completed and the collected data has been subject to quality review. We will prepare a complete report of our findings and submit that to your Board for consideration once the review is complete.

In the interim should you have any questions, please feel free to contact Laurel Carlson of MassDEP at 617-348-4095 or at [Laurel.carlson@state.ma.us](mailto:Laurel.carlson@state.ma.us).

Sincerely,

  
Martin Suuberg  
Acting Regional Director

S/LC/lm

Cc: Dr. Brian Bowcock, Chairman  
Fairhaven Board of Selectmen  
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MassDEP – SERO  
Attn: David Johnston, BRP Deputy Regional Director

MassDEP/Boston  
Attn: Laurel Carlson, BWP  
Marc Wolman, BWP



Equipment:

- Sampling will be performed with a Type I digital Meter (Quest Sound Pro SEL) with accuracy to +/- 1 dB. The sampler will be set to collect data on the "A" weighted scale in "slow" response mode with a one second recording interval (log period). The sampler will be calibrated before and after each sampling event.
- Ground level wind speed will be extrapolated from nearby met data including data from New Bedford Airport and from West Island Weather (KMAFAIRH13). Fairhaven Wind LLC shall provide hub-height wind speeds (10 minute averages) obtained from equipment on either the north or south turbine.

Sampling Sites and Operating Conditions:

- A minimum of four sites will be sampled at the point of perceived maximum impact from the wind turbines. Four sites will be sampled including 3 Teal Circle, 3 Shawmut St, the last residence on Little Bay Road, and the residence at the corner of Mill Road and Route 6. Additional sites may be added as conditions during sampling warrant and at the discretion of MassDEP. MassDEP will coordinate with the residents at the selected sites to determine the point of greatest impact and will conduct the sampling at or near that location or at the property line, whichever is practicable. Sampling will not be conducted indoors.
- The sampler will be mounted at a height of approximately 1.3 meters and shall be located so as to comply with offsets from vertical reflecting surfaces as specified in ANSI 12.9.
- Four different operating conditions (wind speeds/ wind direction) will be evaluated including the following:
  1. At or near the cut-in wind speed where background sound will be the lowest (4-5 m/s wind speed at hub height) with winds from the south, west or southwest such that the Shawmut Street/ Weeden Road and Mill Street area is generally downwind from the turbines.
  2. At or near the cut-in wind speed where background sound will be the lowest (4-5 m/s wind speed at hub height) with winds from the east, southeast or northeast such that the area of Teal Street, John St and Little Bay Road are located generally downwind from the turbines;
  3. At the wind speed where manufacturer data indicates there will be the greatest sound power level from the turbine (9-11 m/s) with winds from the west or southwest,
  4. At a wind speed at or near where the manufacturer data indicates the turbines will produce the greatest sound power level (9-11 m/s) with winds from the east or northeast.

Multiple days of sampling will be required to collect all of the scenarios and locations identified herein.

Procedure:

- Sampling may be conducted during one or more time periods including:



- quietest hours (1am-4am)
- daytime off-peak hours (1:30 pm-4pm);
- evening hours (8pm-11 pm) and
- Sampling will start with data collection during the quietest overnight hours (1am-4am). Should sampling during that time period reveal no exceedence of MassDEP's noise policy at one or more locations for the given wind conditions sampled, daytime and evening sampling will not be conducted for those locations.
- Sampling days will be selected based on predicted wind conditions. MassDEP will make every effort to notify The Town, Fairhaven Wind LLC and residents at whose properties sampling will be conducted at least 24 hours in advance of a sampling event.
- To evaluate the effect of wind speed on turbine sound emission levels (impact sound), three sampling runs will be conducted at each site under each operating condition to establish an  $L_{max}$  for each respective operating condition.  $L_{max}$  is the highest sampled sound level attributed to the sound source (wind turbines) during the sampling run on a one second average. The  $L_{max}$  from each of three runs at a single site and operating condition will be averaged to create a single  $L_{max}$  for that sampling site under the select wind conditions.
- Each sampling run will be 5 minutes in duration. Samples will be collected manually every 5 seconds (60 sound measurements). Consistent with current MassDEP guidance, any peak sound levels that can be attributed to another sound source (e.g. local traffic, resident generated sounds, etc.) will be identified by the study attendant and discarded from the data set before determining  $L_{max}$ .
- At four sites, (Little Bay Road, Teal Circle, Mill Road and Shawmut Street), a pure tone analysis will be conducted. For pure tone analysis, the meter will be set to collect linear sound on a "slow" response and an octave band filter will be employed to speciate sound pressure levels for 10 octave bands. Pure tone analysis will include collection of one minute  $L_{eq}$  sound pressure levels with the wind turbines operating and without the wind turbines operating to evaluate the impact of the wind turbines to pure tone.
- At four sites (Little Bay Road, Teal Circle, Mill Road, Shawmut Street ) background sampling shall be performed to determine the  $L_{90}$  background against which the  $L_{max}$  will be compared. The study attendant shall coordinate with Fairhaven Wind LLC to shut down both wind turbines for the purpose of sampling background.
- As the sampling will be done under conditions where the wind might significantly contribute to total sound recorded, MassDEP will make an effort to exclude data from analysis where the sound of the wind is dominant over the sound of the wind turbines.

#### Assessment of Results

Once the data is collected and quality control review is complete, MassDEP will analyze all of the data to determine if the sound levels from the wind turbines comply with MassDEP's Noise Policy Threshold for impact sound of 10 dB(A) at each of the sampling sites and under each of the defined operating scenarios. The pure tone data will be analyzed to determine if any octave band center frequency sound pressure level attributable to the wind turbines exceeds the two adjacent center frequency sound pressure level by three decibels or more. The results will be compiled into a single report to be provided to the Town once the sampling and data quality review is complete.